CLAIMS

I Claim:

1. An authoring tool that assists an author in building an automated troubleshooter for a product, the authoring tool comprising:

a cause editor interface that allows an author to place, in a cause data structure, information pertaining to causes of malfunction of the product;

an action editor interface that allows an author to place, in an action data structure, information pertaining to actions that can be taken to correct malfunction of the product; and

a question editor interface that allows an author to place, in a question data structure, information pertaining to questions that can be asked a user of the product to help identify causes of malfunction of the product.

2. An authoring tool as in claim 1 wherein the authoring tool additionally comprises a library of modules, at least one of the modules containing troubleshooting information about a component of the product.

3. An authoring tool as in claim 2 wherein the author can save the library of modules to a disk storage device, load the library of modules from the disk storage device and create a new library of modules.

4. An authoring tool as in claim 2 wherein the author can select modules from the library of modules when building the automated troubleshooter for the product.

1   5. An authoring tool as in claim 4 wherein the author can create new

2 modules and delete modules.

1   6. An authoring tool as in claim 5 wherein the author can rename

2 modules and import modules from other libraries of modules.

1   7. An authoring tool as in claim 1 wherein information pertaining to a

2 cause relates to the following categories:

3   name of the cause;

4   parent of the cause;

5   explanation of the cause; and,

6   probability of the cause being source of malfunction.

1   8. An authoring tool as in claim 7 wherein the information pertaining

2 to the cause additionally relates to the following categories:

3   category of the cause;

4   dependency on environment; and,

5   indication that a customer is not to access information pertaining to the

6 cause.

1   9. An authoring tool as in claim 1 wherein information pertaining to

2 an action relates to the following categories:

3   name of the action;

4   explanation of the action;

5   causes solved by the action;

6   probabilities that the action solves specified causes

7   an indication whether the action is for information-gathering or is a

8   potential solution;

9   costs of taking the action; and,

10   trustworthiness of an answer to the action.

1   10. An authoring tool as in claim 9 wherein the information pertaining

2   to the action additionally relates to the following categories:

3   an indication as to whether the action should be taken before other

4   actions;

5   an indication as to whether the action is a workaround;

6   additional actions included with the action;

7   whether the action can only be performed after a specified question has

8   been answered; and,

9   whether the action cannot be performed after a specified question has

10   been answered.

1   11. An authoring tool as in claim 1 wherein information pertaining to a

2   question relates to the following categories:

3   name of the question;

4   explanation of the question;

5   number of answers;

6   names of answers;

7   costs of finding an answer to the question; and,

8   trustworthiness of the answer to the question.

1   12. An authoring tool as in claim 11 wherein the information

2   pertaining to the question additionally relates to the following categories:

3   whether the question can only be performed after a specified question

4   has been answered;

5   whether the question cannot be performed after a specified question

6   has been answered;

7   an indication as to whether the question should be asked before other

8   questions; and,

9   whether the question is a symptom question or a general question.

1   13. An authoring tool as in claim 11 wherein information pertaining to

2   the question particularly pertains to a symptom question and additionally

3   relates to the following categories:

4   causes of a symptom;

5   probability of answers to the question conditional on causes that can

6   cause the symptom; and,

7   probability of answers to the question conditional on no causes that can

8   cause the symptom.

1   14. An authoring tool as in claim 11 wherein information pertaining to

2   the question particularly pertains to a general question and additionally

3   relates to the following categories:

4   prior probabilities of answers to the question;

5   causes that are affected by answers to the question; and,

6   probability of the affected causes conditional on each answer to the

7   question.

1   15. An authoring tool as in claim 1 wherein:

2   the cause editor interface additionally allows an author to create new

3   cause entries;

4   the action editor interface additionally allows an author to create new

5   action entries; and

6   the question editor interface additionally allows an author to create

7   new question entries.

1   16. An authoring tool as in claim 1 wherein:

2   the cause editor interface additionally allows an author to edit existing

3   cause entries;

4   the action editor interface additionally allows an author to edit existing

5   action entries; and

6   the question editor interface additionally allows an author to edit

7   existing question entries.

1   17. An authoring tool as in claim 1 wherein:

2   the cause editor interface additionally allows an author to delete

3   existing cause entries;

4   the action editor interface additionally allows an author to delete

5   existing action entries; and

6   the question editor interface additionally allows an author to delete

7   existing question entries.

1   18. An authoring tool that assists an author in building an automated

2   troubleshooter for a product, the authoring tool comprising:

3   a cause editor interface that allows an author to place, in a cause data

4   structure, information pertaining to causes of malfunction of the product,

5   wherein for a cause the information relates to the following categories:

6   name of the cause,

7   parent of the cause,

8   explanation of the cause, and

9   probability of the cause being source of malfunction.

1   19. An authoring tool as in claim 18 wherein the information

2   pertaining to the cause additionally relates to the following categories:

3   cause category,

4   dependency on environment, and

5   indication that a customer is not to access the information pertaining to

6   the cause.

1   20. An authoring tool that assists an author in building an automated

2   troubleshooter for a product, the authoring tool comprising:

3   an action editor interface that allows an author to place, in an action

4   data structure, information pertaining to actions that can be taken to correct

5   malfunction of the product, wherein for an action the information relates to

6   the following categories:

7   name of the action,

8   explanation of the action,

9   causes solved by the action,

10   probabilities that the action solves specified causes,

11   an indication whether the action is for information-gathering or

12   is a potential solution,

13   costs of taking the action, and

14   trustworthiness of an answer to the action,

1   21. An authoring tool as in claim 20 wherein the information

2   pertaining to the action additionally relates to the following categories:

3   an indication as to whether the action should be taken before other

4   actions,

5   an indication as to whether the action is a workaround;

6   additional actions included with the action,

7   whether the action can only be performed after a specified question has

8   been answered, and

9   whether the action cannot be performed after a specified question has

10   been answered.

1   21. An authoring tool that assists an author in building an automated

2   troubleshooter for a product, the authoring tool comprising:

3   a question editor interface that allows an author to place, in a question

4   data structure, information pertaining to questions that can be asked a user

5   of the product to help identify causes of malfunction of the product, wherein

6   for a question the information relates to the following categories:

7   name of the question,

8   explanation of the question,

9   number of answers,

10   names of answers,

11   costs of finding an answer to the question, and

12   trustworthiness of an answer to the question.

1   23. An authoring tool as in claim 22 wherein the information

2   pertaining to the question additionally relates to the following categories:

3   whether the question can only be performed after a specified question

4   has been answered;

5   whether the question cannot be performed after a specified question

6   has been answered;

7   an indication as to whether the question should be taken before other

8   questions; and,

9   whether the question is a symptom question or a general question.

1   24. An authoring tool as in claim 22 wherein information pertaining to

2   the question particularly pertains to a symptom question and additionally

3   relates to the following categories:

4   causes of a symptom;

5   probability of answers to the question conditional on causes that can

6   cause the symptom; and,

7   probability of answers to the question conditional on no causes that can

8   cause the symptom.

1   25. An authoring tool as in claim 22 wherein information pertaining to

2   the question particularly pertains to a general question and additionally

3   relates to the following categories:

4   prior probabilities of answers to a question;

5   causes that are affected by answers to the question; and,

6   probability of the affected causes conditional on each answer to the

7   question.

1   26. An authoring tool that assists an author in building an automated

2   troubleshooter for a product, the authoring tool comprising:

3   a troubleshooter model editor interface that allows the author to place

4   in a troubleshooter model structure, information pertaining to malfunction of

5   the product; and,

6   a library module editor interface that allows the author to place in a

7   library data structure information pertaining to modules corresponding with

8   components of the product.

1   27. An authoring tool as in claim 26 wherein the information

2   pertaining to modules corresponding with components of the product

3   comprises:

4   name of a component of a module;

5   causes of the component malfunctioning;

6   actions that can resolve malfunctioning of the component; and,

7   questions that can provide information about the causes of the

8   component malfunctioning.

1   28. An authoring tool as in claim 26 wherein the information

2   pertaining to malfunction of the product comprises:

3   name of a problem;

4   causes of the problem;

5   actions that can help resolve the problem;

6   questions that can provide information about the problem; and,

7   an amount of time required to observe whether the problem is present.

1   29. An authoring tool as in claim 26 wherein the author can create a

2   new troubleshooter model, load troubleshooter models from disk storage, save

3   the troubleshooter models to the disk storage such that the troubleshooter

4   models can be run by external troubleshooter software, save the

5   troubleshooter models in text format, and print a troubleshooter model in text

6   format.

1   30. An authoring tool as in claim 26 wherein the author can export

2   causes, actions and questions from a current troubleshooter model to a

3   current library module, and export causes, actions and quests form the

4   current library module to the current troubleshooter model.

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1   31. An authoring tool as in claim 27 wherein the author can get an

2   overview of all causes in the library data structure for quick lookup and

3   insertion, get an overview of all actions in the library data structure for quick

4   lookup and insertion, and get an overview of all questions in the library data

5   structure for quick lookup and insertion.

1   32. An authoring tool as in claim 31 wherein the author can add new

2   categories of causes to the modules, and look up causes that fall into specific

3   categories.

1   33. An authoring tool as in claim 26 wherein the author can view

2   causes in a tree structure, specify sets of probabilities for each level of causes

3   in the tree structure, and normalize the probabilities on each level of causes

4   in the tree structure.